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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/390,966	09/07/1999	GEE L. LUI	D-349	7870

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EXAMINER

BOCURE, TESFALDET

ART UNIT	PAPER NUMBER
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2631

DATE MAILED: 09/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/390,966

Applicant(s)

LUI ET AL.

Examiner

Tesfaldet Bocure

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 8/20/03.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 5-20 is/are allowed.
- 6) ☒ Claim(s) 1 and 2 is/are rejected.
- 7) ☒ Claim(s) 3 and 4 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by **Ho et al.** (US patent number 5,712,877, of a record).

Ho et al. (**Ho** hereinafter) teaches a transmission system (fig.1) for transmitting and receiving a continuous phase modulated signal comprising: a transmitter having a precoder (22) for precoding the sequences of data streams (b_k); a modulator (12) for modulating the precoded data; transmitter (see output from the multiplied signal by the $g(t)$) for transmitting the modulated data to the receiver. Wherein the receiver (see input $r(t)$) receiving the modulated signal and filter (14) for filtering the received modulated signal and generating a filtered received signal as in claim 1.

Further to claim 2, **Ho** also teaches that the received filtered signal is sampled by the sampler 15 and the demodulator (18 and 20) for demodulating the sampled filtered signal to generate an estimate signal (b_k), which corresponds to the data stream (b_k) at the transmitter.

Response to Amendment

In response to applicant's argument regarding to claims 1 and 2, that:

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In the transmitter, the phase-modulated signal is upconverted from a baseband frequency to a high RF frequency for efficient transmission. The transmitted signal is then downconverted during reception from the high RF frequency back down to the baseband frequency. This up and down conversion is very well known art. The reference to the baseband signal now only appears in dependent claim 3 along with the reference to up conversion and down conversion. As such, claim 1 no longer uses the term "demodulation".

The original claim 2 used the term decoding, as in Viterbi decoding algorithms that are commonly used for "demodulating" a sequence of sampled inputs from the filtered continuous phase modulated signal. The primary reference, upon which the examiner relies, uses the term "Viterbi demodulator", which is a specific type of demodulator. Claim 2 and Ho now both use the term "demodulator" for that function, so that, it is now hoped that a proper one-to-one comparison can now be clearly understood by the examiner, without confusion. Claim 1 and 2 are considered together, as when combined, the original data stream, that is a bit data stream, in the transmitter is regenerated in the receiver as an estimate of the unprecoded data symbols, thereby completing the communication from the transmitter to the receiver. The bit data stream is processed in a series of process steps as claimed in claims 1 and 2, and as now compared, step by step with Ho, so as to remove the examination ,confusion and miscomparisons.

Examiner appreciates applicant's intention to make a clear comparison between the disclosed subject matter and that of the prior art. However, a direct comparison should be made between the claimed limitation and that of the prior art. The system of Ho as is the present claimed invention generates unprecoded data (b_k) at the receiver, which corresponds to the once, the bit streams (b_k) at the transmitter.

In response to Applicant's argument that:

The bit data stream is a series of binary digits of zeros and ones. Both the present invention and Ho have an original bit data stream, such as b_k as used in Ho. The bit data stream is symbolized into a series of data symbols. In the case of NRZ 2-ary formatting, for example, the series of 0 and 1 bits are formatted into a series of +1 and -1 data symbols having a symbol set of +1 and -1, for 2ary modulation. For 4-ary modulation using NRZ mapping, two consecutive bits of 0 and 1 are formatted into a data symbol having the symbol set of +1, -1, +3, and -3. Hence, there is generated a sequence of M-ary data symbols. The M-ary symbols are then

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precoded in a particular and prescribed manner, as particularly stated in the precoding tables stated in the specification. The precoded symbol set is the same as in an unprecoded symbol set, that is, +1 and -1 for 2-ary modulation and +1, -1, +3 and -3 for 4-ary modulation. Ho performs the encoding and precoding functions in the "encoder", and Ho's ck output is the precoder output. However, the particular precoding selected in Ho is used specifically to inject pilot symbols for channel estimation, and not to remove decoding, -, after demodulation as does the present invention. The encoded data symbols ck in Ho, along with the injected pilot symbols, are phase modulated using a BT product and transmitted as such.

First, Examiner is not sure why Applicant wants to compare the pilot signal transmitted by the system of Ho with that of the claimed precoding. The comparison should be made between the precoding step in the system Ho that is directed to the streams of data, rather than to the pilot data. The function of the pilot signals as is well known in the art is to aid the receiver to make the channel estimation and has nothing to do with the precoding of the data as is shown by the precoder in figure 2, i.e., the pilot signal is inserted after the stream of data is precoded.

In response to Applicant's argument that:

Upon reception, the present invention uses a phase amplitude modulation (PAM) based filter bank to provide filtered signals having components that directly indicates the unprecoded, that is, the original data symbols. In contrast, Ho uses an anti-aliasing filter to remove noise. The filter output in Ho does not have signal component that directly indicate the unprecoded data symbols bk. There is no similarity in these two filtering functions because the respective filters serve two different respective purposes. Although both are referred to as filters, the actual filtering performed and the purposes are clearly unrelated.

As such, the filter outputs in the present invention are of significant value per se, in that, the filter outputs could be used for directly generating an estimate of the unprecoded data symbols using one of many forms of Viterbi demodulation with various levels of complexity and resulting performance. With a sufficiently large BT product, the output of a signal filter, for example, the principal filter, can be used to directly provide reliable estimates of the unprecoded data stream.

The filter output is sampled at the symbol time boundaries in both Ho and the present invention. The demodulator in the present invention DIRECTLY provides the estimated unprecoded symbols, that is, the uncoded data symbols, whereas the demodulator in Ho only provides an estimate of the encoded data symbols, which must then be DECODED to arrive at the estimate of the uncoded data symbols.

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As such, the examination must now recognize that Ho does not use a precoder for eliminating the decoding step in the receiver, as does the present invention. Clearly, the invention is directly contrary to Ho's teachings. Ho does not address the very problem that the present invention solves. Ho cannot possibly use a precoder as in the present invention to solve the problem of avoiding the final decoding step in the receiver.

Examiner disagrees with the Applicant's assertion that the filtered output from the filtering step in claim 1 is the estimate of the data stream, rather it is an indication of the sequences of data symbols. It should be noted that the term indication, which is broad, is not the same as estimate as alleged by the Applicant. Even for argument sake, the limitation of the filtering step is interpreted in light of the specification, Applicant should refer to the filter 28 disclosed in page 10 of the specification. The filter 28 as disclosed is nothing but to generate a filtered signal to be sampled by the sampler 30. Therefore, the filter 14 in the system of Ho does the same function as that of the filtering step in claim 1.

In response to Applicant's argument that:

Ho does teach the use of a Viterbi demodulator, but such demodulators have long been used. In the case of small BT products and high-order M-ary modulation, Viterbi demodulation is often used to mitigate the degrading effect of intersymbol interference that is typically shown in eye diagrams having poorly defined detection levels in the constellation signal space. However, and as an example, in the case of 2-ary communications with a relatively large BT product and where the output of the principal filter is sampled at symbol boundaries, a simple comparison of the sampled principal filter outputs to a zero threshold value could be used as a demodulator of the unprecoded data symbols. That is, the demodulator could be a simple thresholding device. The choice of demodulator addresses the selected BT value and system BER performance in the presence of channel noise, and is not determinative as to the innovative structure and functions of the invention. Hence, claim 1 does not specify the exact type of demodulator used, as the focus of the invention is directed to the use of a precoder for use with a corresponding filter providing a phase indicating the unprecoded data symbol, so that, postdemodulation decoding is not needed.

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Applicant's argument should be directed to the claimed invention rather than to the disclosed invention. The demodulating step claimed in claim 2, which demodulates the sequence of sampled symbols can be equated to the elements 18 and 20 in the receiver of Ho, which generates an optimum estimate of the data stream (b(k)) which corresponds to the once transmitted by the transmitter.

Allowable Subject Matter

3. Claims 5-20 are allowed.
4. Claims 3 and 4 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US patent numbers 6,148,040, 6,185,259 and 6,430,212 issued to Nguyen et al., Dent and Alisobhani et al. respectively disclose a transmission system for transmitting a continuous phase modulated signal having a precoder.

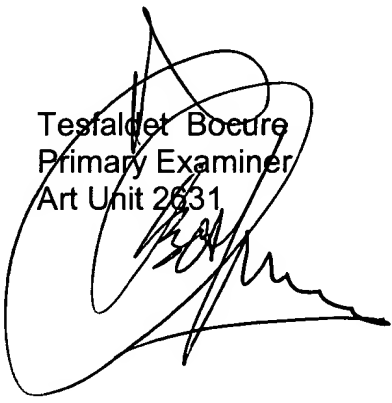
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tesfaldet Bocure whose telephone number is (703) 305-4735. The examiner can normally be reached on Mon-Thur (7:30a-5:00p) & Mon.-Fri (7:30a-5:00p).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad H Ghayour can be reached on (703) 306-3034. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.

T.Bocure

Tesfaldet Bocure
Primary Examiner
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A large, stylized handwritten signature in black ink, overlapping the printed name and title of the examiner.